

# Review of the West Coast Aspelloids *Aspella* and *Dermomurex* (Gastropoda: Muricidae), with the Descriptions of Two New Species

by

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*Abstract.* The ten known representatives of two closely related muricid genera, *Aspella* (four species) and *Dermomurex* (six species), living on the west coast of tropical America are discussed and figured. In *Aspella* these taxa include *A. pyramidalis*, *hastula*, and *pollux*. In *Dermomurex* the taxa are *D. obeliscus*, *indentatus*, *bakeri*, *cunninghamae*, and *myrakeenae*. In addition, two new species known only from Panamá are described: *Aspella strepta* and *Dermomurex gunteri*. Several Atlantic cognate species are also figured for comparison.

ONE WOULD THINK that the shallow-water molluscan fauna of tropical west America is among the best known in the world. But such is not the case; in the dozen years after KEEN published the second edition of *Sea Shells of Tropical West America* (1971) six new species of Muricidae alone were added (VOKES, 1983). The family Muricidae is a prominent part of the shallow-water fauna with almost 100 species. A relatively important member of this group is the genus *Dermomurex*, which until now had five known species; this paper adds a sixth. The genus *Aspella* has now four known species, with the addition of the new species described herein; no other geographic region except the western Atlantic has as many representatives of this small, and often overlooked, genus. Not only are there numerous species of *Aspella* and *Dermomurex* on the west coast of tropical America but there is an unusually large number of cognate species between the Atlantic and Pacific faunas.<sup>1</sup> Table 1 lists these parallel forms.

Both *Aspella* and *Dermomurex* normally occur in very shallow water, frequently under stones at low tide; only

the subgenus *Dermomurex* (*Trialatella*) occurs in offshore waters but the depth is still only about 60 m. This shallow-water habitat should mean that all forms had already been discovered; therefore, it was somewhat of a surprise recently to be given material from the Pacific coast of Panamá of what proved to be two new species of aspelloid.

The term "aspelloid" is an appellation, coined by me, to indicate the two genera *Aspella* and *Dermomurex*, which are united in having an extremely thick, deciduous, chalky outer layer. This peculiar layer, the *intritacalx* (D'ATTILIO & RADWIN, 1971), although not unique to the aspelloids, is not nearly as well developed in any other group, indicating that these two are more closely related to each other than to any other groups.

For many years *Dermomurex* was considered a subgenus of *Aspella* (e.g., KEEN, 1971:527) but work on their geologic history (VOKES, 1975) revealed a long separate development (back to the Oligocene) as well as several divisions that needed to be recognized within *Dermomurex*. The result is that *Aspella* is restricted to the nominate subgenus, with only 17 described species (fossil and Recent). *Dermomurex*, in contrast, is assigned five subgenera. The genus was discussed in a previous work (VOKES, 1975) and it was noted that there were 32 species, fossil and Recent, to be divided among these five subgenera. But, since that time, four additional Recent species have been added to the list: *D. alabastrum* (Adams) (see VOKES, 1976) and *D. oxum* Petuch (1979), both from the western At-

<sup>1</sup> In the family Muricidae, other than the aspelloids and excluding the subfamily Trophoninae, which is too poorly known to be discussed, in the tropical western Atlantic (Florida to northern Brazil) there are 99 species; in the tropical eastern Pacific (the area of Keen's study) there are 86 species. Of this number only 29 may be considered cognates (see VOKES, 1984, for more details).

lantic; *D. africanus* Vokes, 1978, from East Africa; and *D. bobyini* (Kosuge, 1984). The one described herein adds a fifth.

In addition to these Recent species I have in press two other papers in which a total of eleven species will be added: seven from Australia (two Recent and five fossil) and four fossils from the Dominican Republic. Thus, in less than ten years the number of taxa recognized has increased from 32 species to 48.

The same sort of development also can be seen in *Aspella* with the description of seven new species of *Aspella* by RADWIN & D'ATTILIO (1976:219–228) almost doubling the total count in one stroke. One additional species, *A. vokesiana*, from Madagascar, has since been described by HOUART (1983).

## SYSTEMATIC DESCRIPTIONS

Family MURICIDAE Da Costa, 1776

Subfamily MURICINAE Da Costa, 1776

Genus *Aspella* Mörch, 1877

*Aspella* MÖRCH, 1877:24.

**Type-species:** *Ranella anceps* Lamarck, 1822, by monotypy.

**Discussion:** The genus *Aspella* is based upon a species of unknown provenance named by Lamarck as "*Ranella*" *anceps*. As members of the genus are so often, the original specimen is beach-worn, so that identification of the species is impossible. Originally it was confounded with the west coast *A. pyramidalis* (Broderip), but the latter is one of the few *Aspella* species that cannot be confused with *A. anceps*, due to its color pattern.

I formerly (VOKES, 1975, 1978) considered *Aspella anceps* to be the species later described as *A. acuticostata* (Turton, 1932), from South Africa, which I thought also occurred in Australia (the latter subsequently described as *A. ponderi* by RADWIN & D'ATTILIO, 1976).

Since that time Winston Ponder, of the Australian Museum, has located Lamarck's type specimen, which is in the Geneva Museum and, although it did not solve the problem, it did eliminate some of the contenders. Assuming it is one of the described species, we may compare it with the following: *Aspella acuticostata* (Turton, 1932), from South Africa; and *A. ponderi* (Australia), *mauritana* (Mauritius), *cryptica* (Brazil), and *platylaevis* (Indo-Pacific, in general), all of Radwin & D'Attilio, 1976. Of these, *acuticostata*, *mauritana*, and *cryptica* are all too small, as the type is about 14 mm in height. The Australian *A. ponderi* is a possibility at just under 14 mm, but the most likely candidate seems to be *A. platylaevis*. It is the largest species with the proper shape (*i.e.*, a narrow shell unlike the more alate, larger species, such as *A. producta*) and it has the most widespread distribution, being known from Western Australia and Palau, to the Philippine Islands

Table 1

Atlantic-Pacific cognate species of aspelloids.

| Pacific form                               | Atlantic form                         |
|--|---------------------------------------|
|  | <i>Aspella</i>                        |
| <i>A. pyramidalis</i> (Broderip)           | <i>A. cryptica</i> Radwin & D'Attilio |
| <i>A. hastula</i> (Reeve)                  | <i>A. morchi</i> Radwin & D'Attilio   |
| <i>A. pollux</i> Radwin & D'Attilio        | <i>A. castor</i> Radwin & D'Attilio   |
| —  | <i>A. senex</i> Dall                  |
| <i>A. strepta</i> , spec. nov.             | —                                     |
|  | <i>Dermomurex</i>                     |
| <i>D. obeliscus</i> (A. Adams)             | <i>D. pauperculus</i> (C. B. Adams)   |
| <i>D. indenatus</i> (Carpenter)            | <i>D. alabastrum</i> (A. Adams)       |
| <i>D. gunteri</i> , spec. nov.             | —                                     |
| <i>D. bakeri</i> (Hertlein & Strong)       | <i>D. elizabethae</i> (McGinty)       |
| <i>D. cunningghamiae</i> (Berry)           | <i>D. abyssicola</i> (Crosse)         |
| —  | <i>D. oxum</i> Petuch                 |
| <i>D. myrakeenae</i> (Emerson & D'Attilio) | —                                     |

and French Polynesia (Rangiroa and Tahiti—Vokes Coll.). Thus, *A. platylaevis* seems the most likely candidate for identification as Lamarck's species. However, as RADWIN & D'ATTILIO state (1976:21), whatever species might ultimately be proven to be the "real" *A. anceps*, nothing would be changed in the generic concept of *Aspella*, so similar are all the forms.

### *Aspella pyramidalis* (Broderip, 1833)

(Figures 1–3)

*Ranella pyramidalis* BRODERIP, 1833:194; SOWERBY, 1835: pl. 84, fig. 2.

*Ranella anceps* Lamarck: KIENER, 1842:37 (locality data only) not pl. 4, fig. 2 (? = type specimen of *anceps*); REEVE, 1844a:pl. 8, fig. 43 (not of Lamarck).

*Aspella* (*Aspella*) *pyramidalis* (Broderip): KEEN, 1958b:364, not fig. 376 (= *A. pollux* Radwin & D'Attilio); KEEN, 1971:527, fig. 1013 (syntypes, British Museum).

*Aspella pyramidalis* (Broderip): VOKES, 1975:125, pl. 1, figs. 10–13; RADWIN & D'ATTILIO, 1976:23, pl. 1, figs. 4–6 only; text figs. 7 (intritacalx), 8 (radula); FAIR, 1976: 70, pl. 16, figs. 205–207.

**Discussion:** *Aspella pyramidalis* is by far the most common species of *Aspella* on the tropical west coast, ranging from Mazatlán, Mexico, to Panamá (Vokes Coll.), and as far south as Colombia (*vide* RADWIN & D'ATTILIO, 1976:25). This distribution is undoubtedly a reflection of the longer larval stage indicated by the three and three-quarter whorl protoconch, which in *Aspella* is unique to *A. pyramidalis*. All other species have paucispiral protoconchs. It has been cited from the Galápagos, but (so far as I know) all specimens taken there are to be referred to *A. hastula*, which follows.

*Aspella hastula* (Reeve, 1844)

(Figure 4)

*Ranella hastula* REEVE, 1844a:pl. 8, fig. 42; REEVE, 1844b: 139.*Aspella pyramidalis* (Broderip): HERTLEIN & STRONG, 1939: 369, pl. 32, figs. 10, 13 (not of Broderip).*Aspella* (*Aspella*) *hastula* (Reeve): KEEN, 1971:527, fig. 1012.*Aspella hastula* (Reeve): VOKES, 1975:126, pl. 1, fig. 8; FAIR, 1976:47, pl. 16, fig. 208.*Aspella pyramidalis* (Broderip): RADWIN & D'ATTILIO, 1976: 24, in part, pl. 1, figs. 7, 8 only.

**Discussion:** This species is sometimes included with *Aspella pyramidalis*; however, it may be distinguished by the spiral rows of nodes or granulations that mark the shell. RADWIN & D'ATTILIO (1976:24) believed that Reeve's illustration was of the mainland form (*A. pyramidalis*). This seems unlikely for two reasons: one, Reeve specifically mentioned that the shell is "transversely granulatedly striated," and, two, he compared it with "*Ranella anceps*" (which to him was *A. pyramidalis*) stating that it is "less pyramidal" although similar to that species. It seems obvious that he was distinguishing between the two west American species.

Although Reeve gave no locality for the species he named "*R.*" *hastula*, it is almost certainly the Galápagos snail, as this is the only living species known that has granulations (there is one [?]unnamed European Miocene form that is granulated). Granules are also shown in the specimen illustrated by HERTLEIN & STRONG (1939:pl. 32, fig. 10)

said to come from the Pleistocene raised beach on San Salvador Island (James), Galápagos.

*Aspella pollux* Radwin & D'Attilio, 1976

(Figure 5)

*Aspella* (*Aspella*) *pyramidalis* (Broderip): KEEN, 1958b:364, in part, fig. 376 only.*Aspella* cf. *A. pyramidalis* (Broderip): D'ATTILIO & RADWIN, 1971:356, fig. 4 (intritacalx).*Aspella* sp.: VOKES, 1975:126, pl. 1, fig. 9; FAIR, 1976: 88, pl. 16, fig. 211.*Aspella pollux* RADWIN & D'ATTILIO, 1976:225, pl. 1, figs. 3, 29, text-figs. 172 (intritacalx), 173 (radula).

**Discussion:** This species, which has only recently been recognized as distinct from the more abundant *Aspella pyramidalis*, is the eastern Pacific equivalent of *A. producta* in the Indo-Pacific, with a much larger and wider shell form. RADWIN & D'ATTILIO (1976:226) note that it is found from the Gulf of California to Costa Rica, but as yet it has not been taken in Panamá or farther south.

*Aspella strepta* E. H. Vokes, spec. nov.

(Figures 6, 7)

**Description:** Shell small, six teleoconch whorls, protoconch unknown. On first postnuclear whorl six rounded axial ridges; by third postnuclear whorl two of these strengthened into small varices on opposite sides of the shell, with a second set of weaker ribs formed from the

## Explanation of Figures 1 to 14

Figures 1, 2, 3. *Aspella pyramidalis* (Broderip). Locality of all: TU R-166, Barra de Navidad, Jalisco, Mexico.

Figure 1. (×3). USNM 739569; height 13.5 mm, diameter 5.7 mm. With intritacalx present.

Figure 2. (×3). USNM 739569; height 12.7 mm, diameter 5.5 mm. With intritacalx removed, showing underlying color pattern.

Figure 3. (×3). USNM 739569; height 15.0 mm, diameter 6.5 mm.

Figure 4. *Aspella hastula* (Reeve). (×3). USNM 739567; height 12.4 mm, diameter 6.0 mm. Locality: Galápagos Islands, Ecuador.

Figure 5. *Aspella pollux* Radwin & D'Attilio. (×3). USNM 739568; height 13.5 mm, diameter 7.0 mm. Locality: TU R-166, Barra de Navidad, Jalisco, Mexico.

Figures 6, 7. *Aspella strepta* E. H. Vokes, spec. nov. Locality of both: Azuero Peninsula, Panamá.

Figure 6. (×4). USNM 838031 (holotype); height 11.5 mm, diameter 3.3 mm.

Figure 7. (×4). USNM 838032 (paratype); height 11.2 mm, diameter 5.0 mm. With intritacalx removed, showing underlying color pattern.

Figures 8, 9. *Dermomurex* (*Gracilimurex*) *bakeri* (Hertlein & Strong). Locality of both: Manzanillo, Colima, Mexico.

Figure 8. (×3). Purdy Coll.; height 17.5 mm, diameter 8.5 mm.

Figure 9. (×4). Purdy Coll.; height 13.4 mm, diameter 5.5 mm. With intritacalx removed, showing underlying color pattern.

Figure 10. *Dermomurex* (*Gracilimurex*) *elizabethae* (McGinty). (×4). ANSP 176449 (holotype); height 12.5 mm, diameter 5.8 mm. Locality: Middle Sambo Shoals, Florida.

Figure 11. *Dermomurex* (*Triatella*) *cunninghamae* (Berry). (×3). SUPTC 9502 (holotype); height 18.0 mm, diameter 9.2 mm. Locality: Puerto San Carlos, Sonora, Mexico.

Figures 12, 13. *Dermomurex* (*Triatella*) *oxum* Petuch.

Figure 12. (×3). USNM 780648 (holotype); height 12.5 mm, diameter 6.6 mm. Locality: Abrolhos Archipelago, Bahia, Brazil.

Figure 13. (×3). USNM 739571; height 9.0 mm, diameter 4.0 mm. Locality: TU R-98, Holandes Cay, off Cape San Blas, Panamá.

Figure 14. *Dermomurex* (*Triatella*) *abyssicola* (Crosse). (×3). MHNP; height 10.1 mm, diameter 5.6 mm. Locality: Guadeloupe, French Antilles.

Note: Except as indicated, all specimens whitened to show details of ornamentation.



pair of ridges immediately abapertural to these, the third pair being reduced to buttresses across the suture. On fifth postnuclear whorl an abrupt change of alignment, with 240° between one varix and the next formed; varical formation thereafter only every 240°, creating a 60° offset from each varix to the corresponding one on the previous whorl, instead of being aligned up the spire as in the earlier whorls; presence of former varical positions indicated by buttresses across the suture. Except for the varices, shell surface almost totally smooth and polished. Aperture elongate-oval, inner lip appressed, unornamented; inner side of outer lip with six small elongate denticles. Siphonal canal short, dorsally recurved at distal end. Shell covered with a thick intritacalx, marked only by a very faint axial striae; when worn revealing a color pattern consisting of a single brown band covering the area from periphery to suture; apertural denticles tipped with brown.

**Holotype:** USNM 838031.

**Dimensions of holotype:** Height 11.5 mm, diameter 3.3 mm.

**Type locality:** Azuero Peninsula, Panama (approximately 7°15'N, 8°30'W), John Gunter Coll.

**Paratype:** USNM 838032; height 11.2 mm, diameter 5.0 mm; locality same as holotype.

**Discussion:** This new species seems very closely related to *Aspella pyramidalis*, which also occurs in Panamá. The obvious difference is the peculiar offset in the later whorls, giving rise to the twisted appearance of the shell indicated by the species name (Greek—*streptos*, twisted). The color pattern, the nature of the intritacalx, and the form of the aperture are all extremely close to *A. pyramidalis*. It is unfortunate that none of the specimens in the type lot have the protoconch preserved, for this might be a definitive difference. At the present time, it is not inconceivable that these specimens represent an atypical population of *A. pyramidalis* but this seems unlikely.

The only other differences noted are that the spire of

*Aspella strepta* is higher and narrower than *A. pyramidalis*, even in the early stages before the twisting occurs, and the pronounced dorsoventral flattening is not as evident in the new species. Also, the spiral lines seen in the intritacalx of *A. pyramidalis* do not seem to be present in *A. strepta*.

The type lot consists of only three specimens, all collected under stones at low tide by Mr. John Gunter, Panamá City, Panamá, and generously given to me for study. No other specimens are known.

#### Genus *Dermomurex* Monterosato, 1890

*Poweria* MONTEROSATO, 1884:113. (*Non Poweria* Bonaparte, 1840.)

**Type-species:** *Murex scalarinus* Bivona-Bernardi, by original designation (*Murex scalarinus* Bivona-Bernardi, 1832, = *Murex scalaroides* Blainville, 1829).

*Dermomurex* MONTEROSATO, 1890:181. New name for *Poweria* Monterosato non Bonaparte.

*Hexachorda* COSSMANN, 1903:47.

**Type-species:** *Murex tenellus* Mayer, 1869, by original designation.

#### Subgenus *Dermomurex* s.s.

*Dermomurex* (*Dermomurex*) *obeliscus*  
(A. Adams, 1853)

(Figure 18)

*Murex obeliscus* A. ADAMS, 1853:269; SOWERBY, 1879:fig. 233.

*Aspella* (?*Dermomurex*) *obeliscus* (Adams): EMERSON & D'ATTILIO, 1970:91, figs. 7-9 (figs. 8, 9, syntypes, British Museum); KEEN, 1971:527, fig. 1016.

*Dermomurex obeliscus* (Adams): D'ATTILIO & RADWIN, 1971:346, figs. 1, 6 (intritacalx); RADWIN & D'ATTILIO, 1976:46, pl. 1, figs. 21-24, text-fig. 23 (radula); FAIR, 1976:63, pl. 16, fig. 222.

*Dermomurex* (*Dermomurex*) *obeliscus* (Adams): VOKES, 1975:127.

**Discussion:** First described without locality data, then ascribed to the Caribbean by SOWERBY (1879:pl. 23, fig.

#### Explanation of Figures 15 to 21

Figures 15, 16. *Dermomurex* (*Dermomurex*) *gunteri* E. H. Vokes, spec. nov. Locality of both: Los Buzos, Combutal, Azuero Peninsula, Panamá.

Figure 15. (×3). USNM 838035 (holotype); height 20.0 mm, diameter 8.4 mm.

Figure 16. (×3). USNM 838036 (paratype); height 15.3 mm, diameter 7.0 mm.

Figure 17. *Dermomurex* (*Takia*) *myrakeenae* (Emerson & D'Attilio). (×3). Wright Coll. M-309; height 16.3 mm, diameter 9.0 mm. Locality: West Mexico.

Figure 18. *Dermomurex* (*Dermomurex*) *obeliscus* (A. Adams).

(×2½). USNM 838038; height 23.5 mm, diameter 11.0 mm. Locality: Isla Isote, Nayarit, Mexico.

Figure 19. *Dermomurex* (*Dermomurex*) *pauperculus* (C. B. Adams). (×2). MCZ 125072; height 30.0 mm, diameter 14.8 mm. Locality: Causeway, Biscayne Bay, Miami, Florida.

Figure 20. *Dermomurex* (*Dermomurex*) *indentatus* (Carpenter). (×2). Gunter Coll.; height 29.0 mm, diameter 13.6 mm. Locality: Montijo Bay, Panamá.

Figure 21. *Dermomurex* (*Dermomurex*) *alabastrum* (A. Adams). (×2). AMNH 186115; height 29.0 mm, diameter 13.0 mm. Locality: St. Croix, Virgin Islands.

Note: All specimens whitened to show details of ornamentation.



15a



15b



16a



17a



16b



17b



18a



18b



19a



19b



20a



20b



21a



21b

233), it was not until 1970 that EMERSON & D'ATTILIO (1970:91) demonstrated that this species is a member of the west American fauna. The shell usually cited as "*Murex obeliscus*" from the Caribbean is *Dermomurex pauperculus* (C. B. Adams), which is indeed the Atlantic cognate of *D. obeliscus* (see Figure 19), but it is not the same species.

This is the most common of the west coast species of *Dermomurex*, being found under stones at low tide, from Mazatlán to Panamá.

*Dermomurex (Dermomurex) indentatus*  
(Carpenter, 1857)

(Figure 20)

*Muricidea (?)erinaceoides* var. *indentata* CARPENTER, 1857: 527.

*Aspella (Dermomurex) perplexa* KEEN, 1958a:248, pl. 30, fig. 11 (only).

*Aspella (?)Dermomurex) indentata* (Carpenter): KEEN, 1958b: 365, fig. 378 (with *A. perplexa* in synonymy).

*Muricidea (?)erinaceoides* var. *indentata* Carpenter: KEEN, 1968:425, pl. 58, fig. 64 (holotype, British Museum).

*Aspella (?)Dermomurex) indentata* (Carpenter): EMERSON & D'ATTILIO, 1970:90, fig. 3.

*Aspella (Dermomurex) indentata* (Carpenter): KEEN, 1971: 527, fig. 1014 (left fig. = holotype *A. perplexa* Keen; right fig. = holotype "*M.*" *indentata*).

*Dermomurex (Dermomurex) indentatus* (Carpenter): VOKES, 1975:127.

*Dermomurex indentatus* (Carpenter): RADWIN & D'ATTILIO, 1976:46, pl. 1, fig. 17; FAIR, 1976:50, pl. 16, fig. 218.

**Discussion:** Although described in 1857, this species was not illustrated for one hundred years (KEEN, 1958b:fig. 378), and it was not until 1968 that a figure of the holotype was published (KEEN, 1968:pl. 58, fig. 64). In 1970 EMERSON & D'ATTILIO discussed "*Aspella*" *indentata* and noted that it was "rare in collections." This situation has not changed; to my knowledge it is known only from Pacific Panamá and Sonora, Mexico, near the type locality, Mazatlán (AMNH 180694).

The western Atlantic cognate of this species is the equally poorly known *Dermomurex alabastrum* (A. Adams) (see Figure 21), which I once suggested was probably a synonym of *D. indentatus* (VOKES, 1975:140), as I had never seen a specimen of the Atlantic species. This error was corrected in a note on *D. alabastrum* (VOKES, 1976: 45), after having examined a number of the latter in the collection of the late Mr. Gordon Nowell-Usticke of St. Croix. One of his shells was figured at that time (VOKES, 1976:text-fig. 1). The Nowell-Usticke collection is now in the American Museum of Natural History.

*Dermomurex (Dermomurex) gunteri*

E. H. Vokes, spec. nov.

(Figures 15, 16)

**Description:** Shell elongate, with eight teleoconch whorls; protoconch unknown (protoconch and several early whorls

usually truncated and plugged). On early postnuclear whorls spiral ornamentation confined to a few faint spiral threads, best seen with intritacalx partially worn away; on median whorls gradually developing two, and then three, wide flattened bands, each with a series of nodules at regular intervals, approximately 0.5 mm apart; made conspicuous by the intritacalx usually being worn from the tops of the nodules, giving a dotted appearance to the shell. On body whorl five such bands, becoming less distinct with adult growth; three spiral threads between each pair of wider bands; that band at the base of the body whorl (the one covered by successive whorls) much heavier and less distinctly nodulose. Axial ornamentation on early postnuclear whorls of six angulate ridges, each placed abaperturally to corresponding varix on preceding whorl, giving a backward spiral aspect to the varical line from apex to canal. Varices initially narrow and flaring, six per whorl until about sixth postnuclear whorl, then two of every three gradually reduced in size, leaving a large, flattened buttress across the suture to mark their former position, as well as a slight flare along the siphonal canal; the other two persisting, on opposite sides of the whorl, as weak varices, only that at the aperture having any strength at all. Suture impressed, divided by the varical buttresses into a series of six deep pits per whorl. Aperture large, oval; inner lip with a wide, thickened inductura, free-standing and swept back over the parietal area at the anterior portion, appressed at the posterior end; outer lip with a rounded, sinuated edge, inner side patulous on anterior half, with about six small denticles within. Siphonal canal short, broad, recurved distally; almost closed but open by a narrow slit, with the two sides of the apertural lips almost meeting across the opening, giving the appearance of a circular parietal shield. Color of shell basically a transparent white, but usually totally covered by an extremely thick, cream-colored intritacalx; interior of aperture enameled in a pale yellow, with the tips of denticles touched by a small orange dot. Intritacalx when fresh rather massive and unornamented, but when worn, exhibiting a series of reticulated tunnels. Operculum and radula unknown.

**Holotype:** USNM 838035.

**Dimensions of holotype:** Height 20.0 mm, diameter 8.4 mm.

**Type locality:** Los Buzos, Combutal, Azuero Peninsula, Panamá (approximately 7°15'N, 80°30'W), John Gunter Coll.

**Paratype:** USNM 838036; height 15.3 mm, diameter 7.0 mm; locality same as holotype.

**Discussion:** During a visit to Panamá I was given 16 specimens of a *Dermomurex* so totally different from all described species there could be no question but that it was new. Although its generic affinities are unmistakable, there is no other living species with which it may be com-

pared. The most conspicuous features include the large flared aperture, in which the inductura is flattened so as to look more like a *Phyllocoma* than a *Dermomurex*, and the rows of nodules ornamenting the spiral bands. This latter ornament is also seen in the French Miocene species *D. tenellus* (Mayer) (figured in VOKES, 1975:pl. 2, figs. 1, 2), which is the only form that bears more than a generic resemblance to *D. gunteri*. In the French species there is also the tendency to develop only two varices on the adult body whorl, but it lacks the flaring inductura and the very deep pits along the sutural line. If *D. tenellus* is ancestral to *D. gunteri* there should be some connecting forms somewhere between the French Miocene and the Recent eastern Pacific, but so far these have not been found.

The entire type lot was collected by John Gunter, of Panamá City, Panamá. All were inhabited by hermit crabs on a rocky shore. But it is evident from the fact that every specimen has a damaged spire, which was plugged in life, that the species lives in a relatively high energy environment, presumably among the same rocks, in the wave zone.

#### Subgenus *Gracilimurex* Thiele, 1929

*Gracilimurex* THIELE, 1929:289.

**Type-species:** *Murex bicolor* Thiele, by original designation [*Murex bicolor* Thiele, 1929, non *Murex bicolor* Risso, 1826, =*Aspella bakeri* Hertlein & Strong, 1951].

#### *Dermomurex (Gracilimurex) bakeri* (Hertlein & Strong, 1951)

(Figures 8, 9)

*Murex (Gracilimurex) bicolor* THIELE, 1929:289, fig. 314 (non *M. bicolor* Risso, 1826, nec Valenciennes, 1832, nec Scacchi, 1833, nec Cantraine, 1835, nec Monterosato, 1878).

*Aspella bakeri* HERTLEIN & STRONG, 1951:79, pl. 26, figs. 1, 2; DUSHANE & SPHON, 1968:242, pl. 35, fig. 9 (holotype).

*Aspella* (?*Aspella*) *bakeri* Hertlein & Strong: KEEN, 1958b: 364, fig. 375.

*Gracilimurex bakeri* (Hertlein & Strong): D'ATTILIO & RADWIN, 1971:346, fig. 5 (inritacalx); FAIR, 1976:23, pl. 16, fig. 217.

*Aspella (Gracilimurex) bakeri* Hertlein & Strong: KEEN, 1971: 529, fig. 1017.

*Dermomurex (Gracilimurex) bakeri* (Hertlein & Strong): VOKES, 1975:129.

*Dermomurex bakeri* (Hertlein & Strong): RADWIN & D'ATTILIO, 1976:45, pl. 1, figs. 18, 19.

**Discussion:** *Dermomurex bakeri* is a peculiar species, because of the tendency of the shell to have a bilateral flattening similar to that in *Aspella*. However, the nature of the ornamentation and the radula (unpublished drawing, D'Attilio *in litt.*) seem to indicate placement in *Dermomurex* rather than *Aspella*. The only other closely related form is the Atlantic cognate, *D. (Gracilimurex) elizabethae*

(McGinty) (here figured, Figure 10), which (so far as is known) is confined to Florida, the Bahamas, and Greater Antilles, in the western Atlantic. *Dermomurex bakeri* is equally limited in distribution, being known only from the Gulf of California.

#### Subgenus *Trialatella* Berry, 1964

*Trialatella* BERRY, 1964:149.

**Type-species:** *Trialatella cunninghamae* Berry, 1964, by original designation.

#### *Dermomurex (Trialatella) cunninghamae* (Berry, 1964)

(Figure 11)

*Trialatella cunninghamae* BERRY, 1964:149; FAIR, 1976:35, pl. 16, fig. 219 (holotype).

*Aspella (Trialatella) cunninghamae* (Berry): KEEN, 1971:529, fig. 1019 (holotype).

*Dermomurex (Trialatella) cunninghamae* (Berry): VOKES, 1975:130, pl. 4, fig. 4 (holotype).

*Dermomurex cunninghamae* (Berry): RADWIN & D'ATTILIO, 1976:45, pl. 1, fig. 20 (paratype, Berry Coll.).

**Discussion:** Although named as the type of a new genus, *Trialatella*, this species was placed in *Dermomurex* subgenus *Trialatella* by VOKES (1975:130) as they differ only by the expanded varices and the elongate siphonal canal. At the same time, the Recent Caribbean "*Murex*" *abyssicola* Crosse, 1865, was placed in the same subgenus. More recently PETUCH (1979:517, figs. 1-E, 1-F) has described a second species from the western Atlantic, *D. (Trialatella) oxum*, from the Abrolhos Archipelago, Brazil (here figured, Figure 12).

Petuch did not compare his new species with *Dermomurex abyssicola*, simply stating that it was "the only Atlantic *Dermomurex*" resembling the new form. There seems little doubt that the specimen figured by VOKES (1975:pl. 4, fig. 3; refigured here, Figure 13), as a possible juvenile of *D. abyssicola*, is also to be referred to *D. oxum*. Crosse's type specimen cannot be located in either the Paris Muséum d'Histoire Naturelle or the British Museum (Natural History), but J. P. Pointier, of the Paris Museum, who has been studying the fauna of Guadeloupe for some time (POINTIER *et al.*, 1982) has collected numerous examples of a *Dermomurex* that we assume is *D. abyssicola* (Figure 14), as this is the type locality for the species. He has observed (personal communication) that the animal is never associated with coral reefs, as PETUCH (1979) indicated for *D. oxum*, but is found on the under side of rocky ledges in about 5 m of water. However, Petuch noted that the specimens of *D. oxum* were found dead in the mud at the base of the reef, having rolled down after death. This is almost certainly the explanation for the extraordinary depth of 250 fathoms originally cited by Crosse, for it is doubtful any member of the genus lives at that depth.



This may well be the explanation for the range of depths recorded for the eastern Pacific *Dermomurex cunninghamae*, which is found in slightly deeper water than the usual *Dermomurex* s.s., from 20 to 100 m. Records indicate the form has been taken from off the coast of Mexico (Sonora—the type and AMNH 186677; Nayarit—AMNH 74162) and Pacific Panamá (Isla Cebáco—AMNH 213736; Isla Coiba—BMNH). The association with rock rather than coral suggests that *D. abyssicola* is the true cognate of *D. cunninghamae* rather than the coral-associated *D. oxum*.

In addition to the still extant *Dermomurex abyssicola* and *D. oxum*, there are several fossil species of *Triatella* in the western Atlantic. The writer earlier (VOKES, 1975) described *D. farleyensis*, from the early Miocene Chipola Formation of northwestern Florida, and *D. antecessor*, from the Pleistocene Moín and Bermont formations of Costa Rica and Florida, respectively. In another paper (VOKES, in press A) a fourth species is described from the Miocene Cercado/Gurabo Formation of the Dominican Republic that seems to connect the younger and older fossil forms. All of these are extremely similar to the eastern Pacific *D. cunninghamae* and it seems obvious the entire group is very closely related.

#### Subgenus *Takia* Kuroda, 1953

*Takia* KURODA, 1953:190.

**Type-species:** *Murex inermis* Sowerby, 1841, by original designation (*non Murex inermis* Philippi, 1836, *nec M. inermis* Dujardin, 1837 [? = Philippi] = *Dermomurex (Takia) infrons* Vokes, 1974).

*Dermomurex (Takia) myrakeenae*  
(Emerson & D'Attilio, 1970)

(Figure 17)

*Aspella (Dermomurex) perplexa* KEEN, 1958b:248, in part, pl. 30, figs. 12, 13, only.

*Aspella myrakeenae* EMERSON & D'ATTILIO, 1970:89, figs. 1, 2, 4-6, 10 (operculum), 11 (radula).

*Aspella (Dermomurex) myrakeenae* Emerson & D'Attilio: KEEN, 1971:527, fig. 1015 (holotype).

*Dermomurex (Takia) myrakeenae* (Emerson & D'Attilio): VOKES, 1975:130, pl. 5, fig. 7.

*Dermomurex myrakeenae* (Emerson & D'Attilio): RADWIN & D'ATTILIO, 1976:46, pl. 1, fig. 28.

*Takia myrakeenae* (Emerson & D'Attilio): FAIR, 1976:61, pl. 16, fig. 220.

**Discussion:** When the genus *Dermomurex* was treated by VOKES (1975) it was noted that *D. myrakeenae* was most closely related to the Indo-Pacific type of the subgenus *Takia*. Only in the Oligocene do we find any other New World species having an appearance much like that of the eastern Pacific form. The Miocene species referred by VOKES (1975:152-156) to the subgenus *Viator* (*D. sexangulus*, *D. vaughani*, *D. curviductus*, and *D. taurinensis*) have been removed from the latter subgenus due to the discovery of several Australian Tertiary species that change

ideas concerning evolution of the lineage (VOKES, in press B). Although they are now considered better placed in *Takia* they are probably not in a direct line from the Oligocene *D. cookei* Vokes to the Recent *D. myrakeenae*, but represent another parallel lineage. However, in the interval since 1975 there have been no other fossil species discovered that shed any light on the connection between the Oligocene and the Recent form.

This species is another of the relatively shallow-water members of *Dermomurex*, being found in depths of from 3 to 20 m, only on the west coast of Mexico, from Cabo San Lucas and Mazatlán, south to Acapulco.

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#### Supplementary Locality Data for Figured Specimens

The following are Tulane University Recent locality numbers:

R-98. R/V *Anton Bruun* Cruise 10, dredged in 40 m, northwest of Holandes Cay, and east-northeast of Cape San Blas (9°37'N, 78°50'W), Panamá.

R-166. Barra de Navidad, rocky point across inlet from main sand bar, Jalisco, Mexico.

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